www.unal.edu.co/icn/publicaciones/caldasia.htm Caldasia 27(2):277-286. 2005

THE PROSCOPIIDAE (ORTHOPTERA, EUMASTACOIDEA) FAMILY IN COLOMBIA. I. THE GENUS *APIOSCELIS*

La familia Proscopiidae (Orthoptera, Eumastacoidea) en Colombia. I. El género *Apioscelis*

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ABSTRACT

Four new species of Colombian genus *Apioscelis* Brunner von Wattenwyl are described. The external morphology, phallic complexes and spermathecae are described in detail. Additionally a key to most species is given.

Key words. *Apioscelis*, insects of Colombia, Proscopiidae.

RESUMEN

Se describen cuatro nuevas especies, pertenecientes a la entomofauna colombiana, del género *Apioscelis* Brunner von Wattenwyl. Se dan tablas de medidas y se describen las espermatecas y los complejos fálicos, así como también se hace una descripción de la morfología externa. Se agrega una clave para la mayoría de las especies del género.

Palabras clave. *Apioscelis*, insectos de Colombia, Proscopiidae.

INTRODUCTION

Before the present work, the genus *Apioscelis* Brunner von Wattenwyl, 1890 was represented only by *A. bulbosa* (Scudder 1868) (the type species of the genus), *A. gracilis* Br. v. W., 1890 and *A. granulosa* Walker, 1870 (synonomized with *A bulbosa* by Mello Leitao (1939), *A. compacta* Br. v. W. 1890, *A. colombica* Br. v. W. 1890, and *A tuberculata* (Walker (1879). *A verrucosa* Br. v. W. was synonymized with the latter by Mello Leitao (1939). Carbonell (1977) maintained these synonyms. We have not revised these species to see what level of validity they have because both authors (i.e. Brunner von Wattenwyl and Mello Leitao) used only external characters. Liana (1972) examined the lectotype of *A. verrucosa* and compared it with an individual of *A. tuberculata*, and by her criteria they were badly synonimized, as she found significant differences in the tegumental sculpturing, in the subesternal plate, and in the subgenital plate of the females. A definitive characterization of the two species utilizing the phallic complex is impossible because the type of *A. tuberculata* is mutilated.

Bentos-Pereira (unpublished data) examined specimens of *A. bulbosa* from a Peruvian locality in Loreto, near the type locality, and found the male genitalia to be identical with those described by Liana (1972) from specimens collected from the same region in Perú (Iquitos and Pebas, the latter poorly identified as "a Brazilian locality"). Liana (op.cit.) also examined a male from Fonte Boa, a Brazilian locality on the Amazon near the mouth of the R. Juruá. However Liana did not dissect out the spermathecae, despite having female specimens available.

Liana (1972) first described other characters important for this group, such as the subgenital plate of the females of *A. verrucosa, A. tuberculata,* and *A. bulbosa,* and the endophallus of the males of *A. bulbosa* and *A tuberculata*. Jago (1989) later described the phallic complex of the male of *A bulbos*a in a much more detailed way, introducing the nomenclature which he proposed for the group and which we maintain in the present work. All species of the genus belong to the Amazonian region and its area of influence in Colombia, Ecuador, Brazil and Peru.

MATERIALS AND METHODS

Specimens examined: 3 males and 3 females of each species. The descriptions were made using a Nikon stereomicroscope model SMZ-10. The drawings were made with the aid of eyepieces with gridded graticules and a camera lucida. Measurements were taken with a Mitutoyo caliper, following the work of Bentos-Pereira (1996), in which these dimensions were shown to be significant for this group (Table 1).

After dissection, spermathecae and phallic complexes were cleaned by exposure to a 10% KOH solution for approximately 24 hours after dissection.

The descriptions of the phallic complex use the nomenclature proposed by Jago (1989).

Types are deposited in the collections of the Instituto de Ciencias Naturales de la Universidad Nacional de Colombia, in Bogotá (ICN-MHN).

RESULTS

Apioscelis Brunner von Wattenwyl

Type species of the genus: *Apioscelis bulbosa* Brunner v. Wattenwyl.

Generic diagnosis:

Proscopiids belong to the fauna of the Amazon and its zone of influence. On average females are some 10 cm long and the males some 8 cm. The head is characteristic, with a small pyramidal fastigium, inclined forwards and downward, eyes moderately protuberant, with a strong postocular constriction and a basal zone (where the mouthparts insert) which is very wide and rather globose. These characters are more evident in the males than in the females.

Cuticle is very granular in head, thorax and legs and it is smooth and it is of a different colour in abdomen.

The hind femur is characteristic, having a large globose inflation in its proximal third.

The male subgenital plate is short, blunt and rounded; the female subgenital plate has a variable posterior border.

Phallic complex with a tubular endophallus, strongly sclerified.. Epiphallus formed by plates 1 & 2, large and well sclerified. Lophi with well-developed hooks, plates 4 & 4b are present. Medial slit without sclerified margins. Plates 10 and 6 are lacking .

Spermatheca is very variable, but always single. The duct can have various digitiform prolongations. The way in which the spermatheca starts forms a rigid tube. It is well sclerified and with a considerably larger diameter than the duct, but much less than of the bursa

Apioscelis florezi n.sp

Female holotype. Abp 632. COLOMBIA: Amazonas: Leticia, Km 11, Via Tarapaca , 100 m. 8. Nov. 2001, Eduardo Florez leg.

Table 1. Measurements of new species from *Apioscelis* B.v.W.

	Apioscelis florezi n. sp	*Apioscelis laetitiaensis n.sp.*			*Apioscelis christianeae n.sp.*	*Apioscelis araracuensis n.sp.*
	Holotype F	Holotype M	Paratype M	Paratype F	Holotype M	Holotype F
Fastigium	1.7	0.75	0.5	1.1	0.9	1.6
Eye	2.9	2.5	2.25	2.5	2.45	2.5
Head	7.35	5.5	4.8	7.8	5.9	7.05
Pronotum	19.3	15.35	15.75	18.65	19.85	17.1
Mesonotum	3.15	2.25	2.25	3.25	2.35	2.85
Metanotum	3	1.95	1.75	2.85	2	2.75

Description: See Figs 1-5. Size 15.7 cm. The exact colour cannot be described, as the specimen is preserved in alcohol. But appear to be a difference in tone between thorax and abdomen.

Head strongly narrowed below the eyes and then inflated up to the insertion of the mandibles. Fastigium slightly inclined downwards, smaller than the eyes and with a rounded apex and lateral carina and a well-marked dorsal medial carina; these carina unite at the apex and extend to the lower border of the eyes. Eyes globose, protruding, situated laterally. Antennae with 6 segments. Cuticle of the nota with irregularly distributed granules.

Pronotum is cylindrical in the first half, the second half with slightly concave margins. Anterior part swelled forming a hood. Pleural suture defined by a line of conspicuous granules. The first pair of legs inserted ventrally, approximately in the middle of the pronotum. The mesonotum and metanotum are almost without elevations, Meso/meta suture slightly concave. Hind legs with globose femora with 4 lines of tubercles dorsally and 4 ventrally. Knees with two small spines. Tibiae have two rows of spines in their dorsal part, with 14 spines in the external row and 12 in the internal.

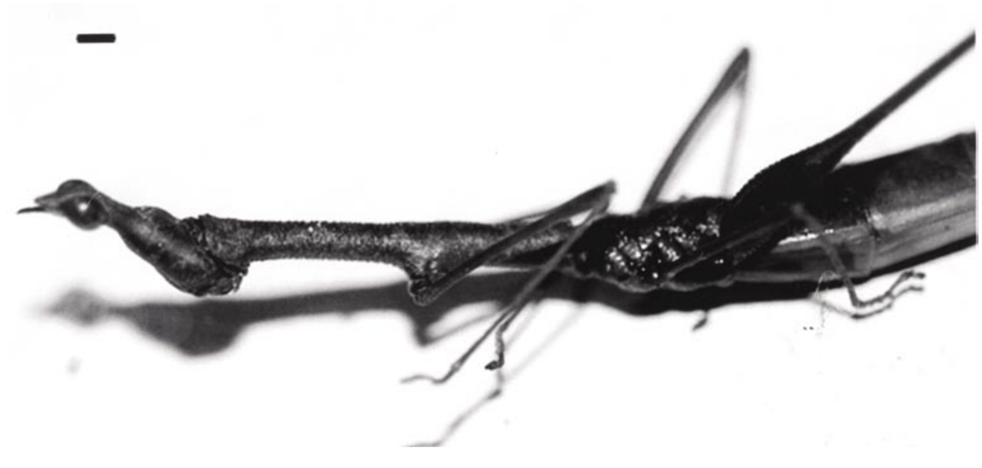

Figure 1. *A. florezi*. Holotype, female. Head and Pronotus. Lateral view. Scale 3 mm.

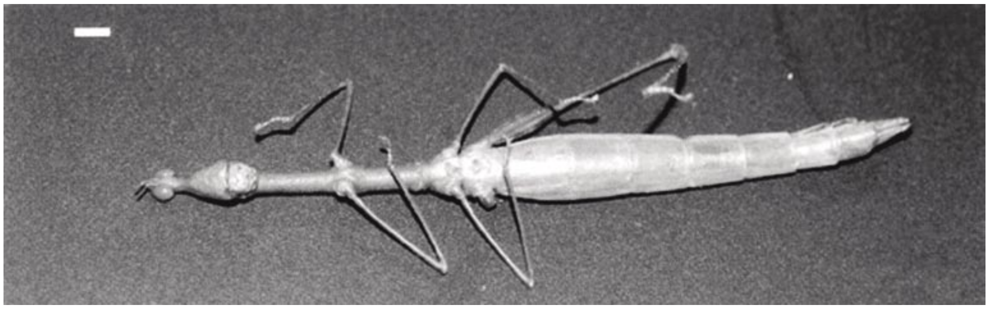

Figure 2. *A. florezi*. Holotype, female. Ventral View.. Scale 6 mm.

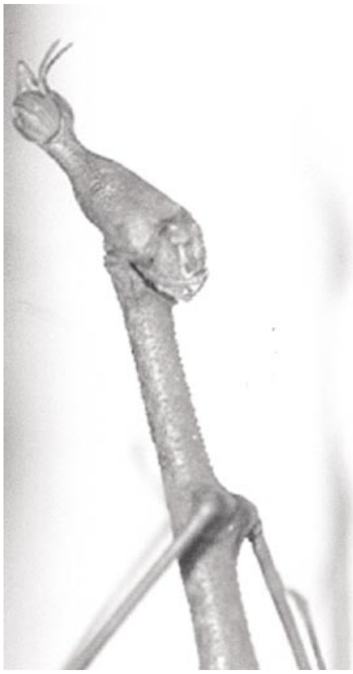

Figure 3. *A. florezi*. Holotype, female. Head. Latero-ventral view. Scale 3 mm.

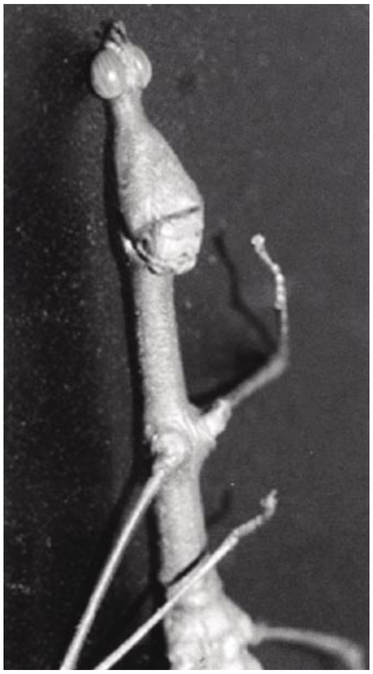

Figure 4. *A. florezi*. Holotype, female. Head. Vental view. Scale 3 mm.

Abdomen is dilated, with smooth cuticle. Pleura delimited by a line.

Subgenital plate as shown in Fig. 6

Spermatheca (Fig. 7) single, formed by a long smooth twisted tube terminating in two diverticula, a very small preapical one, united by a short tube to the base of the apical diverticulum. Apical diverticulum large and globular, about two and a half times the size of the preapical one. Spermatheca joined to the bursa copulatrix by a dorsal prolongation of the latter in the form of a tube poor sclerified.

Etymology: the species is dedicated to Prof. Eduardo Florez of the National University of Colombia.

Apioscelis laetitiaensis n.sp.

Male holotype, abp 166; Colombia, Leticia, Km 7 on Via Tarapaca, 250 m, 27.Oct.1996 A. Varón leg.

Male. Paratype: abp 167; same date and locality as the holotype.

Description: Size 5.7 cm.in holotype, paratype: 5.5 cm. Cuticle granular. Head strongly constricted below the eyes. Fastigium small, inclined forwards and downwards, with a very sharp point. Aristae with well-marked carinae, slightly tuberculate. The dorsal carina run from behind the eyes to the post ocular constriction. Eyes large and globose.

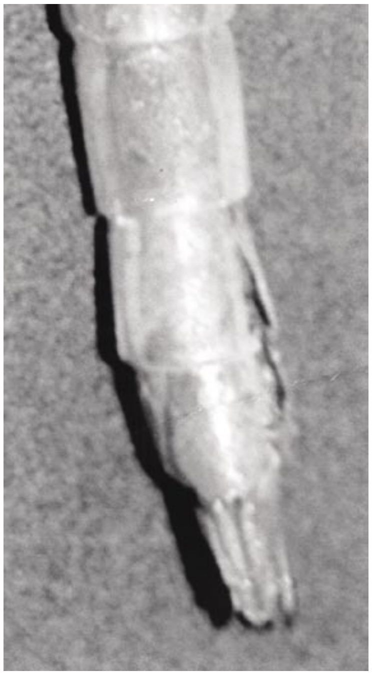

Figure 5. *A. florezi*. Holotype, female. Abdominal tip: subgenital plate. Ventral view. Scale 2 mm.

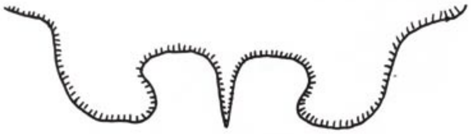

Figure 6. Posterior edge subgenital plate of *A. florezi* (female). Schematic.

Antenna with 6 segments. Antennal organs on the 5th and 6th segments.

Pronotum with straight edges. Anterior margin dilated with a carina similar to that of the fastigium and its posterior margin thickened to a ring. Pleural sutures as a right line as illustrated (Fig. 4) Mesonotum, metanotum and 1st abdominal segment somewhat inflated. Medial band wide and granulated. Without well defined lateral areas. Femora of the first pair of legs subquadrate in cross-section with small tubercles in poorly defined ridges. Tibia four sided, with spines, six external and 10 internal. Second pair, just like the first pair, but with 7 external spines and 9 internal ones. Third pair of legs with the first third of the femur very globose, then abruptly narrowing and remaining so to the end. It has 4 dorsal tuberculate carina, one lateral one each side, and 2 ventromedial carinae. The knees have almost imperceptible spines. Tibiae with 13 internal spines and 15 external spines.

Abdomen with a single medial carina, with granules and pits decreasing towards the extremity. Each segment is slightly dilated towards its distal end. Subgenital plate rounded, smooth and globose.

Phallic complex (Fig. 8) epiphallus well developed, plates 1 & 2 strongly united. Lophi with large and strong hooks, the points directed upwards and outwards. Medial

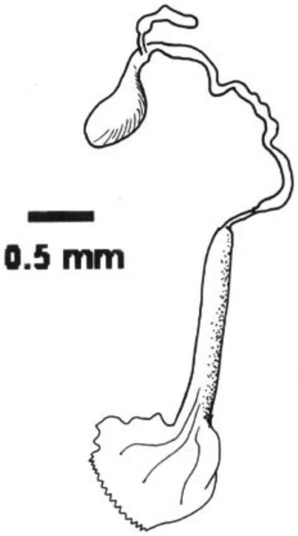

Figure 7. *A. florezi*. Spermathecae.

cleft simple, without sclerifications. Plates 4 joined twice behind and below the cleft. Endophallus funnel shaped, elongated, the degree of sclerification of the tube decreasing until it ends as a membrane which unites with those of the medial cleft. The proximal extremity bears a ridged margin and an asymmetrical cleft. The ejaculatory duct could not be found.

Etymology: belonging to Leticia, from ~Latin laetitia, laetititiae, happiness.

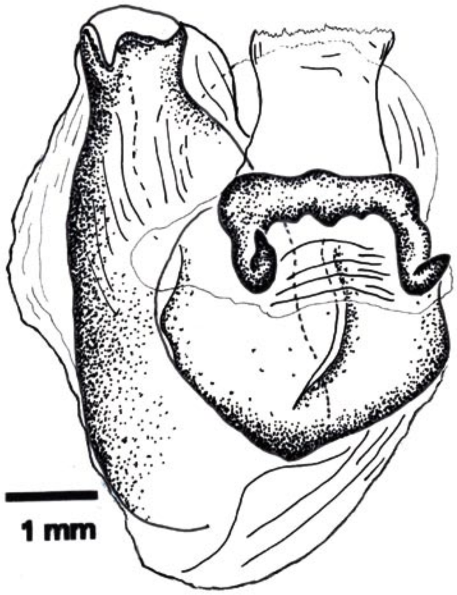

Figure 8. *A. laetitiaensis*. Phallus. Dorsal view.

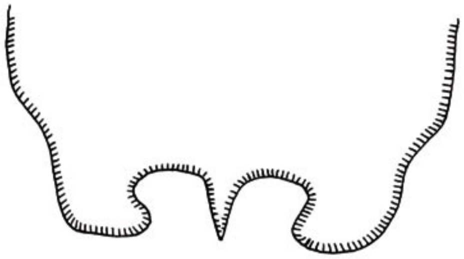

Figure 9. Posterior edge subgenital plate of *A. laetitiaensis.* (female). Schematic.

Female paratype. abp 168: same data as holotype.

Size: 13.8 cm. Granulation of the cuticle less dense than in the male. Fastigium with the apex more rounded. Head, antennae and pronotum same as in male. Mesonotum and metanotum show some differences: they are flat and with smooth irregular lateral areas, granular medial band poor developed. First pair of legs have rounded femora, with lines of small dark tubercles arranged longitudinally. Tibiae four-sided, microserrated, with 9 internal and 8 external spines. The second pair of legs much the same as the first. Tibiae with 6 external and 10 internal spines. Abdomen smooth with a medial carina.

Epiproct is like an elongate tongue with a rounded point. Cerci small. Valves are large with sharp points, not very concave and with the borders microserrate. Posterior edge of subgenital plate as in Fig 9.

Spermatheca (Fig.10) complex. A short curved tube which terminates in a point, giving rise laterally to a long and curved duct with loops and adventitious lateral prolongations, of variable lengths but always shorter than the original tube and which terminates in a point. The tube terminates in an ampulla with two unequal diverticulae.

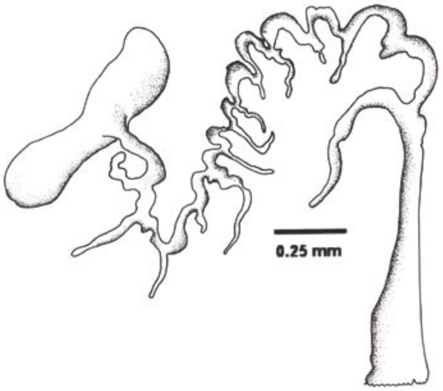

Figure 10. *A. laetitiaensis.* Spermathecae

Apioscelis christianeae n. sp.

Male holotype abp 177 COLOMBIA: Amazonas, Parque Nacional Amancayacu, Mata-Mata 3˚ 4' 16" S & 70˚ 15'40" W, 30 Aug – 5 Sept. 1997. B. Brown & G. Kung leg.

Description: Size 16 cm.. Cuticle complete cover by small tubercules. Legs and thorax reddish chestnut in colour and the abdomen dark green.

Head strongly constricted below the eyes. Fastigium very small and inclined forward and downward, the tip quite sharp. Aristae with well-marked carina, the dorsal ones extend behind the eyes, almost straight. A very short carinae runs below the eye into the central lower area. There is another very well-marked carina running from the apex of the fastigium to the collar which divides the head into two parts. The eyes are large and globose. Antennae has 6 segments, with the lenticular sensorial organ on the last one. There is a deep depression in the supra epistomal triangle. The pronotum is extremely thin. The insertion of the first pair of legs looks like a knot. The anterior margin has a tuberculate carina. The posterior margin is a little inflated with a darker line, the pleural suture is non-existent.

Mesonotum is elongate, with an irregular medial band, which is more granular, a row of very irregular granules above the pleural sutures. The meso-meta suture is just a line. Metanotum with folds. The suture between the metathorax and the first abdominal segment is marked by a carinae with a medial tubercle and two smooth lateral spaces and then some irregular tubercles. First pair of legs with the femur smooth and rounded with minute black points. Tibiae four sided and serrate with 10 exterior spines and 9 internal spines. Second pair of legs, with the femur smooth and rounded, tibiae similar to those of the first pair with 11 external spines and 9 internal ones. Third pair of legs with the femur dilated and very globose proximally over a third of its total length, the remainder very thin. Dorsal and ventral carina have tubercles, which look like spines. Knees with small spines. Tibiae serrate, with 12 internal spines and 16 external ones.

Abdomen smooth with little pits. Small epiproct with a rounded pointed tip. Cerci large. Subgenital plate globose and round. Pallium sclerified.

Phallic complex (Figs.11, 12) very similar to that of *A. laetitiaensis.* The tips of the lophi point directly upwards and the plates 4 are more elongate and sclerified, and they do not fuse below and behind the median cleft. The endophallus, very sclerified, is a little narrower than in *A.laetititaensis* and has the proximal border smooth.

Etymology: The species is dedicated to Dr. Christiane Amedegnato, notable orthopterologist and friend from the Museum of Natural History, Paris, France.

Apioscelis araracuensis n.sp.

Female holotype ICN-MHN Ort.217, abp 162: COLOMBIA, Araracuara, "Las Peñas", 10 October 1982 Nora Mesa, leg.

Description: Size: 13 cm. Cuticle very dark, in tones of chestnut brown and densely granular. Head strongly constricted below the eyes. Fastigium very small and inclined forward and downward, tip rounded and with an almost imperceptible carina on the aristae. Eyes globose with flecks. Antenna

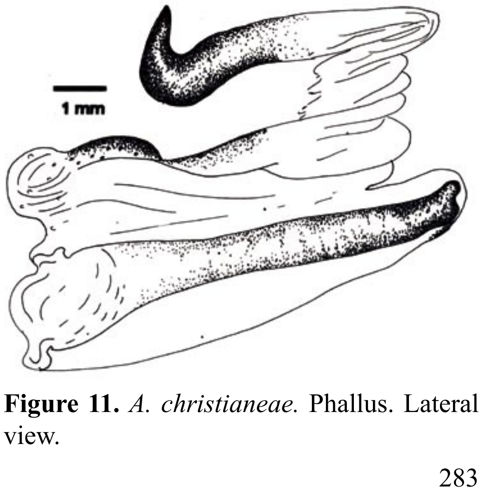

Figure 11. *A. christianeae.* Phallus. Lateral view.

are broken. Pronotum very narrow, lateral margins parallel, at the anterior extremity much dilated, forming a hood which covers the neck sclerites, the posterior extremity smooth. Mesonotum slightly inflated, separated from the metanotum by a cleft. A wide granular band runs through the centre of the meso, metathoracic and 1st abdominal segment. Pleural suture smooth. Metanotum very narrow. The first abdominal segment is very large with two transversally well defined zones: the first is more or less four sided, similar to the mesonotum and the second is very small The last is divided longitudinal by a zone devoid of tubercles, which is raised and forms a medial carina which extends over the rest of the abdomen. The first pair of legs has rounded femora. The tibiae are four sided with their margins barely separated, with 9 external spines and 8 internal ones. The second pair of legs has the femora 4 sided, dilated towards the distal end. Tibiae with serrate aristae and the cuticle slightly granulated, with 10 external spines and 5 internal ones disposed in an irregular manner.

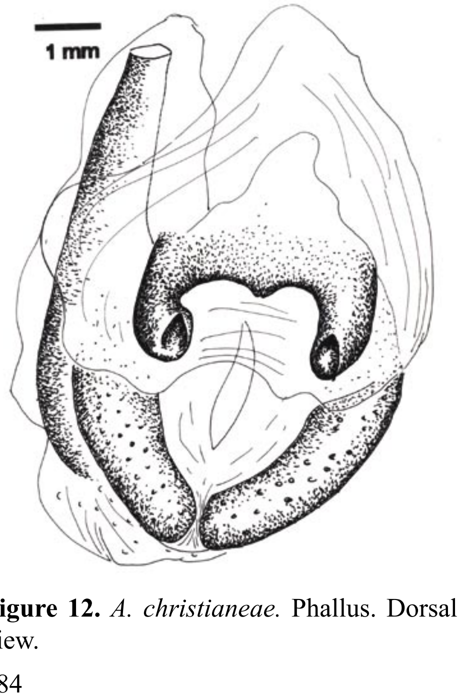

Figure 12. *A. christianeae.* Phallus. Dorsal view.

The femur of the third pair of legs is strongly inflated basal, the dorsal carinae very marked, the rest of the femur very thin. Knees with moderately sized spines. The tibial spines are very small, 8 internal and 11 external.

Epiproct like a long finely pointed tongue covered with fine granules which bear a hair at their tip. Cerci very small. Valves of the ovipositor elongate, smooth and with sharp points. The lower valves are missing in the type. Subgenital plate with straight tip.

Spermatheca (Fig 13) large and complex. It has the form of a short straight tube which joins with a basal and dorsal projection of the bursa copulatrix. This tube gives rise to numerous prolongations (12 in the type) of diverse lengths; some of them bifurcate, without terminal ampullae

Etymology: the specific name refers to the type locality.

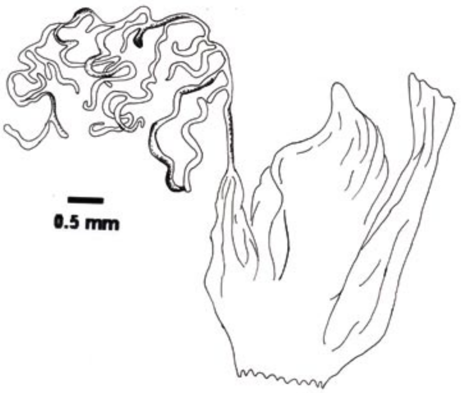

Figure 13. *A. araracuensis.* Spermathecae.

DISCUSSION

The extreme poverty of described Proscopiids in the Colombian fauna impresses us with the urgent necessity to start to describe the species we have seen, belonging to the collection of the Instituto de Ciencias Naturales of the Universidad de Colombia, in an attempt to start to characterize the very rich fauna of the country. The genus *Apioscelis* is very well represented in the

Colombian Amazon, where we have found various new species, which can be added to those already existing, some of which are Colombian and others, such as *A. bulbosa*, are from the Peruvian Amazon.

It is an easy genus to identify, by the characteristic globose form of the head and the femur of the hind legs.

Apioscelis is an Amazonian genus, arboricole, but it can also be found in the understory, on the ground, and also in secondary forest (Amedegnato pers. com.).

The species described in this work are very homogeneous in size, phallic structure and external characteristics.

The female genitalia of *A. araracuensis* and that of *A. laetitiaensis* is different from that of *A. florezi* and also it is different from that which of *A. bulbosa* (Bentos-Pereira unpubl. data). The first two have a complex spermatheca, with digitiform prolongations on the duct, while the second two have similar terminal ampullae, but the duct is smooth. All species seem to have a dorsal tube on the bursa copulatrix which is the origin of the spermathecal duct, of a much more rigid consistency than the membranous and amorphous and generally much-pleated bursa, differing from what we have seen in other species (Bentos-Pereira 1998, Bentos-Pereira & Rowell 1999).

The subgenital plates of the females also present interesting variation.

A. florezi and *A. laetitiaensis* have very similar posterior margins of the subgenital plate. Liana (1972) described the subgenital plates of the females of *A. tuberculata, A. bulbosa* and *A. verrucosa* as having elaborate posterior margins differing both from our species and from each other. *A. araracuensis* is distinct with a smooth subgenital plate. It is reasonable to suppose that these species, coming from widely separated localities, belong to different groups of species as well, and a later study of the biogeography of the Amazonian Proscopiids, with better distribution data and more specimens, will show this better.

We have not seen the type of *A. colombica*, nor have we found data or references to it in the consulted literature (Mello Leitao 1939, Liana 1972 and Jago 1989), for which reason we are not able to include it in the key that we present below. Mello Leitao (1939) confines himself to transcribing Brunner v. Wattenwyl's original description and giving the dimensions of the male and female types.

Key to the species of *Apioscelis*:

1. Head conical without postocular constricti on….. .... *A. compacta* Brunner Von Wattenwyl.
1'. Head with very pronounced post-ocular constriction.……………………………2, 2'
2. Male with subgenital plate as a knife, long, slightly protruding….*A. tuberculata* Walker.
2'. Male with subgenital plate short (blunted) …….…………….....…………………3, 3'
3. Subgenital plate of female with a smooth posterior margin……..*A. araracuensis* n. sp.
3. Subgenital plate of female with a very elaborate posterior margin.……………4, 4'
4. Plates 4 of the phallic complex are not united below the medial slit. ....……*A. christianeae* n. sp.
4'. Plates 4 of the phallic complex are united below the medial slit. ..……………….. 5, 5'
5. Lophi's hook upwardly…………………. …………………………*A. bulbosa* Scudder
5. Lophi's hook different….…………….. 6, 6'
6. Spermatheca with simple duct, lacking digitiform prolongations.…...*A. florezi* n. sp.
6'. Spermatheca with complex duct, having numerous digitiform prolongations………… ………….……………. *laetitiaensis* n. sp.

ACKNOWLEDGEMENTS

The autors wish to thank Mitzy F. Porras and A. Varón for diverse help in the course of this study. To German Amat for his logistic support and for having opened to us the world of Colombian Proscopiids. To E. Florez, H. Rowel,l and C. Amedegnato for sharing their knowledge of the Amazon and their experience in taxonomy and to C.S. Carbonell for his support and instruction since forever and with H. Rowell for critically reading the manuscript.

Anonymous reviewer improves to much our job.

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Recibido: 14/01/2005
Aceptado: 30/07/2005